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ABSTRACT

This learning packet presents geography units designed for self-directed study use by students in grades K-8. Instructions are given regarding how to use the materials. The five themes of geography provide a framework for analyzing questions about a place, how that place came to be the way it is, and how the place effects the people living there. Activities are designed to aid students in the development of skills needed to read, interpret, and create maps. Students practice techniques of geographic analysis using their own environment. Answer keys and bibliography are provided. (MM)

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GEOGRAPHY

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The Art and Science of Place

A Zephyr Press Learning Packet

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Geography

The Art and Science of Place

by Alice Pierce

Self-directed study units
for grades K–8

Process- and product-oriented
interdisciplinary learning through

- Evaluating
- Imagining
- Researching
- Reporting
- Thinking and reacting
- Mapping and charting
- Creating and appreciating
- Classifying and comparing
- Career exploration and goal clarification

Zephyr
Press®
Reaching Their Highest Potential
Tucson, Arizona

Geography
The Art and Science of Place

Grades K–8

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The Premise

Learning Is Natural

Children are active participants in their learning, not passive vessels to be filled.

They are always seeking and choosing what they will learn and what they will not learn.

Their interest, trust, and active involvement are crucial.

Children tend to become personally involved in projects that appeal to a variety of modalities—reading, writing, reasoning, building, imagining, and creating.

What a gift we give when we respect the child's natural need to explore, to reflect, to communicate, to dream, to celebrate!

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Reaching Their Highest Potential

A Word to the Teacher

The World at Your Doorstep: A Study of Geography

Geography is the ultimate holistic discipline. It means, literally, "to describe Earth." Geographers ask "where?" "why?" and "how?" about everything on Earth. Geography can include a whole pack of sciences: cartography, geology, meteorology, demographics, ecology, economics, political science. Geography looks at the relationships among all these subjects. Geography goes hand in hand with history, as well. Since humankind absorbs quite a bit from what surrounds us, literature, art, and music also require a solid grounding in geography.

George J. Demko (1992), a former director of the United States Office of the Geographer, describes geography this way:

> Geography—real-world geography—is the art and science of location, or place. It is about spatial patterns and spatial processes. It is about which way the wind blows from Chernobyl, the Pacific "ring of fire," AIDS, terrorists, and refugees. It is about acid rain, El Niño, ocean dumping, cultural censorship, droughts and famines, and it is about MiTTs (. . . the measured minutes of telecommunication traffic) . . . Geography is the why and where of an ever-changing universe.

This packet will stimulate students' appreciation for viewing the world in geographic terms. The five themes of geography provide a framework for analyzing questions about a place: how that place came to be the way it is, and how the place affects the people living there. By practicing the various skills needed to read, interpret, and create maps, students gain access to one of the geographer's most important tools. Students start practicing techniques of geographic analysis using their own environment. You can then adapt the unit to focus on another region to coordinate with simultaneous studies in history, literature, science, and other disciplines.

Rationale for Self-Directed Learning

Our children's education must be more than the memorization of capitals of states, products of countries, and dates and places of past wars. Most teachers and parents would agree that it is important for our children to learn to think for themselves, to make wise choices, to work independently, to evaluate thoughtfully the results of their study, and to use their knowledge and skills creatively.

Obstacles to Independent Learning

In spite of the teacher's best efforts, many, if not most, classroom programs involve students in schedules and organizational plans that foster dependence rather than the independence we prefer. Students are told what to learn and how long it will take them to learn it. The teacher not only defines the resources but also decides whether the learning experience was a satisfactory and valuable one.

A Learning Atmosphere

Each time we, as educators, focus on what our objectives are, we need to take a fresh look at our classroom mode of operation and evaluate the effectiveness of the way we teach. Quite naturally, for most of us, our teaching style has had more to do with how we were taught than with what recent research has shown about the learning process. Even our good instincts have been overcome by the years of conditioning we have known in our own educational processes.

Like a breath of fresh air, recent findings from research on the brain support our intuitive knowledge. This research shows that our brains are receptive to learning only under certain conditions. Our job is to translate that information into a classroom atmosphere that provides

- challenge
- freedom within structure
- trust and warmth
- recognition of each student's learning process

- opportunities to experience success
- personal involvement in the curriculum

A natural transition generally occurs that transforms the former "teacher-lecturer" into a "fellow learner." As fellow learner, the teacher becomes a resource person, a facilitator, and a classroom manager. In this maturing atmosphere, students gradually come to see themselves as responsible for their own learning, and a foundation for self-direction is set.

At this point, an unexpected problem sometimes arises. We find students no more ready for their independent learning than we, as teachers, were ready to allow it. This common occurrence is mentioned repeatedly in the literature dealing with programming for the gifted, an area in which independent study and research are recommended as major curricular activities. See Suggested Readings.

From Passive Learner to Active Participant

(Bridging the Gap)

The Zephyr self-directed study unit was developed expressly to bridge that gap: to transport students from the position of passive recipients to that of active participants in their own pursuit of knowledge.

Within the defined structure of each unit, students are given opportunities to

- make choices
- learn at their own paces
- learn in a manner suited to their own learning styles
- expand their research skills
- use a variety of modalities
- plan their own time
- develop the skills of creative, critical, and evaluative thinking
- experience whole-brain learning

Because assuming responsibility for directing their own learning is often an unfamiliar situation for students, they will need your encouragement at the start. Generally within six to nine weeks most students will be well on their way from teacher-dependence to self-motivation. (Beginning the venture with only a few choices, then gradually arranging the setting so that there are more and more choices works best.) As students assume more responsibility, many teachers begin to consider the school library as just another part of the classroom. Both teachers and students can benefit from the enormous resources available in most school libraries.

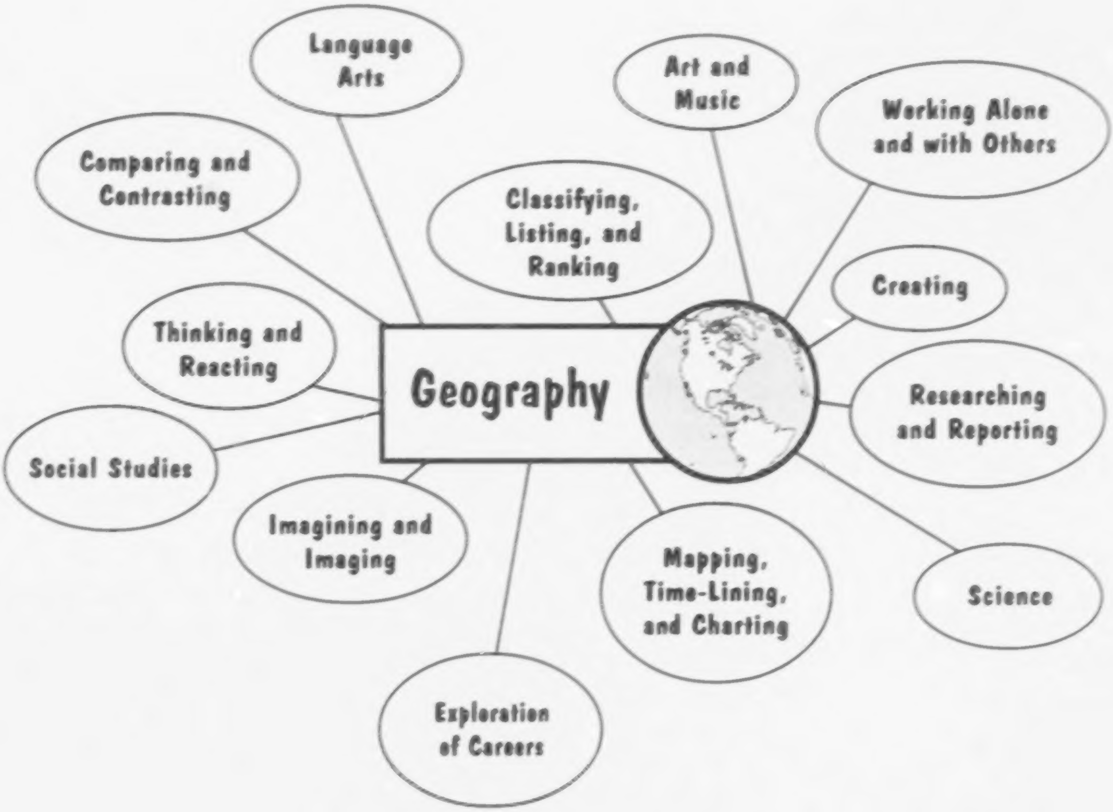
Eventually, a few students will be ready for a true investigative research study of professional quality as suggested by Joseph Renzulli in *Enrichment Triad Model: A Guide for Developing Defensible Programs for the Gifted and Talented.*

The Format

These units were originally developed for gifted students, but we now recognize that every child is gifted in one or more of the multiple intelligences. The units emphasize the use of higher-level thinking skills and are appropriate for use in any classroom where the goal is to encourage students to become responsible for their own education.

Interdisciplinary in content, each unit envelops a broad view of the topic by integrating the "basics" into each activity.

Within this book are two complete units: one created for the lower elementary student and one for the upper elementary student. Suggestions for adapting or adjusting either of the levels to fit any individual classroom are included.


Language Arts
Art and Music
Working Alone and with Others
Comparing and Contrasting
Classifying, Listing, and Ranking
Creating
Thinking and Reacting
Geography
Researching and Reporting
Social Studies
Imagining and Imaging
Mapping, Time-Lining, and Charting
Science
Exploration of Careers

Suggested Readings

Self-Directed Study

Armstrong, Thomas. *In Their Own Way: Discovering and Encouraging Your Child's Personal Learning Style.* Los Angeles: J. P. Tarcher, 1988.

Brewer, Chris, and Don G. Campbell. *Rhythms of Learning: Creative Tools for Developing Lifelong Skills.* Tucson, Ariz.: Zephyr Press, 1991.

Clark, Barbara. *Optimizing Learning.* Columbus, Ohio: Merrill Publishing Company, 1986.

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Maker, C. J. *Curriculum Development for the Gifted.* Rockville, Md.: Aspen Systems Corporation, 1982.

Malehorn, Hal. *Open to Change: Options for Teaching Self-Directed Learners.* Palo Alto, Calif.: Scott Foresman and Company, 1978.

Miller, Ron. *What Are Schools For? Holistic Education in American Culture.* Brandon, Vt.: Holistic Education Press, 1990.

Purkey, William, and John Novak. *Inviting School Success: A Self-Concept Approach to Teaching and Learning.* 2d ed. Belmont, Calif.: Wadsworth Publishing Company, 1984.

Renzulli, Joseph. *Enrichment Triad Model: A Guide for Developing Defensible Programs for the Gifted and Talented.* Mansfield, Conn.: Creative Learning Press, 1977.

Stoddard, Lynn. *Redesigning Education: A Guide for Developing Human Greatness.* Tucson, Ariz.: Zephyr Press, 1991.

Udall, Anne J., and Joan E. Daniels. *Creating the Thoughtful Classroom: Strategies to Promote Student Thinking.* Tucson, Ariz.: Zephyr Press, 1991.

Getting Started

1. Select a topic as an extension of a regular subject (particularly when your class seems to crave more), or select a topic to pursue that is of particular interest and may not be a part of the curriculum. To zero in on special interests, administer an interest survey to each student.

2. Copy the unit for each student. When using these units for the entire class, you may want to expand or delete activities for individual students.

3. Set up a center in the classroom that encourages exploration in the subject field. You'll want to include a variety of materials. Be creative. The purpose of the center is to excite the students, so begin with lots of hands-on materials. Allow for ample browsing time and encourage students to investigate and become absorbed.

4. Go over each activity in the unit with the students, discussing and answering any questions. You, as teacher, are the key to successful implementation. Because most children are already well versed in the "One Right Answer" game, they will need encouragement to branch out into many of the open-ended activities in the packets.

5. Set the stage. Plan conferences and provide resources as needed. Then, get out of the way and let your students learn.

6. Give as much time as each student needs to complete each activity in the unit. The entire packet might take from five to ten weeks or longer.

7. As each activity is completed and evaluated, initial the activity near each number. You will want to evaluate on the basis of the response that is appropriate for each individual student.

8. When a student shows extreme interest in the topic, the completion of this unit might be only the beginning. This student may be ready for further study and research and may need only resources, guidance, and freedom to pursue his/her well-planned project.

Interest Development Center

Geography

The purpose of this interest center is to stimulate interest in the topic. Students need time for browsing and investigating for maximum benefit. These ideas are merely beginnings; you and your students will think of more. Let parents and other teachers know about the center, as well, and it will grow without effort.

The creation of a resource center is the first activity in this learning packet. If you are using unit 1, you will want to help students collect these items. If you are using unit 2, you will want to use it to help you guide your students in creating their own centers.

Books, Posters, Magazines, Videotapes, Filmstrips, and Charts

a wide variety of atlases
various explorers from a wide variety of cultures
ancient Greek culture
ancient Chinese culture
ancient Roman culture
inventions
inventors
Vikings
cartography
astronomy

Field Trips

Use minipackets for field trips as a supplement to your planned activities to increase student involvement in planning and learning from the field trip.

Direction Packets

Find road maps from your school to the site. Plan the route, including any stops along the way. Determine how long it will take to get there. Make direction packets for all field trip drivers, including copies of maps with the route marked and written step-by-step directions.

Information Packets

Write for information to the place you are going and find out more about it on the Internet. Use the five themes, if relevant. Find out what important sites there are to see at your destination and plan how the class will spend its time. Make information packets for your class by copying interesting parts of any public domain information you gathered, including a map. Lead a class discussion about the specific sites you will be visiting and their significance.

Hikes or Walks

For trips to natural settings, use a topographical map of the area to plan a class hike. Consider factors such as how steep the trail is and how long you have for the hike. If you will be changing trails, notice natural landmarks that will help you find your way. Lead your class on the hike.

For trips to urban settings, use a street map of the appropriate scale to plan a walk around the city. Decide what sites you would like to see and any longer stops you will make. Plan the walk to fit into the time schedule for the whole trip. Lead your class on the walk.

On-Site Environmental Observations

When you have reached your destination, find a quiet time to observe the natural and human environment. Record your observations on the environmental observations work sheet or a mind map. Later that day, students share their observations with the class in a group discussion.

On-Site Artwork

Toward the end of your stay, allow students to spend an hour or more in their favorite sites. They paint or draw the sites, write poems or songs about them, or write short stories using the sites as settings. If students need to, allow more time for them to finish their work once you are back. Students display or read their works.

Environmental Observation Sheet

Name: ______________________________

Environment to be studied: ______________________________

Observe the environment and write your observations below

1. List five features of the natural environment you observe.

2. List five features of the human environment you observe.

3. Are there natural features that have been adapted by humans (such as trees planted for shade)? If so, list five adapted features.

4. List some features of the natural and adapted environment that are used by humans. How are they used?

   Natural Feature

   Use

5. List the features of the environment that you particularly liked. Why?

6. List the features of the environment that you particularly disliked. Why?

7. What signs of change did you observe in the environment?

To Prepare for Further Research

Students will need to decide:

- What will the study be? What will be investigated and produced?
- Where will the background information be found (e.g., speaker, interviews, books, film, microfiche, documents)?
- What, exactly, will be the form of the product: a model, a manuscript, or . . . ?
- Who might be interested in the product: professionals in the field, publishers, organizations, or . . . ?
- What is needed to begin: specific plans, resources, deadlines, or . . . ?

Suggestions for Adapting the Unit to Your Particular Learning Situation

- Require fewer or more research sources.
- Assign more of the activities to small groups instead of to individual students.
- Give fewer or more choices.
- Delete some activities altogether.
- Arrange the unit as a class project and have students choose different parts to complete.
- Add some activities of your own.

Introduction

Geography

Geographers ask questions about Earth as they seek to understand and define it. The kinds of questions geographers ask are categorized into five concepts, or themes:

Location: Position on Earth's Surface

"Where in the world is . . . ?" This question is one of the most commonly asked. Drawing maps and learning to use them allows us to find out where places are in the world. Any spot on Earth can be identified with an exact global address using latitude and longitude. We can also locate a place using its relative location in relation to somewhere we know. For example, a city might be 50 miles northeast of another city along an interstate highway.

Place: Physical and Human Characteristics

"What makes this place unique?" Geographers study places by studying physical and cultural characteristics and the ways these characteristics affect the people living there. What landforms exist and what is the climate like? What type of people live there and what language do they speak? In what ways do they earn their livings, what is their architecture like, and what system of government do they have?

Human and Environmental Interaction

"How do people adjust to or change their environment?" Geographers ask questions about why people settled where they did and how they use their natural resources. How have people adapted to the local environment? How have they changed or modified it to meet their needs? What is the human impact on the environment? Issues of pollution, deforestation, endangered species, food production and consumption, landfill and waste disposal are all topics of human and environmental interaction.

Movement: People, Goods, and Ideas

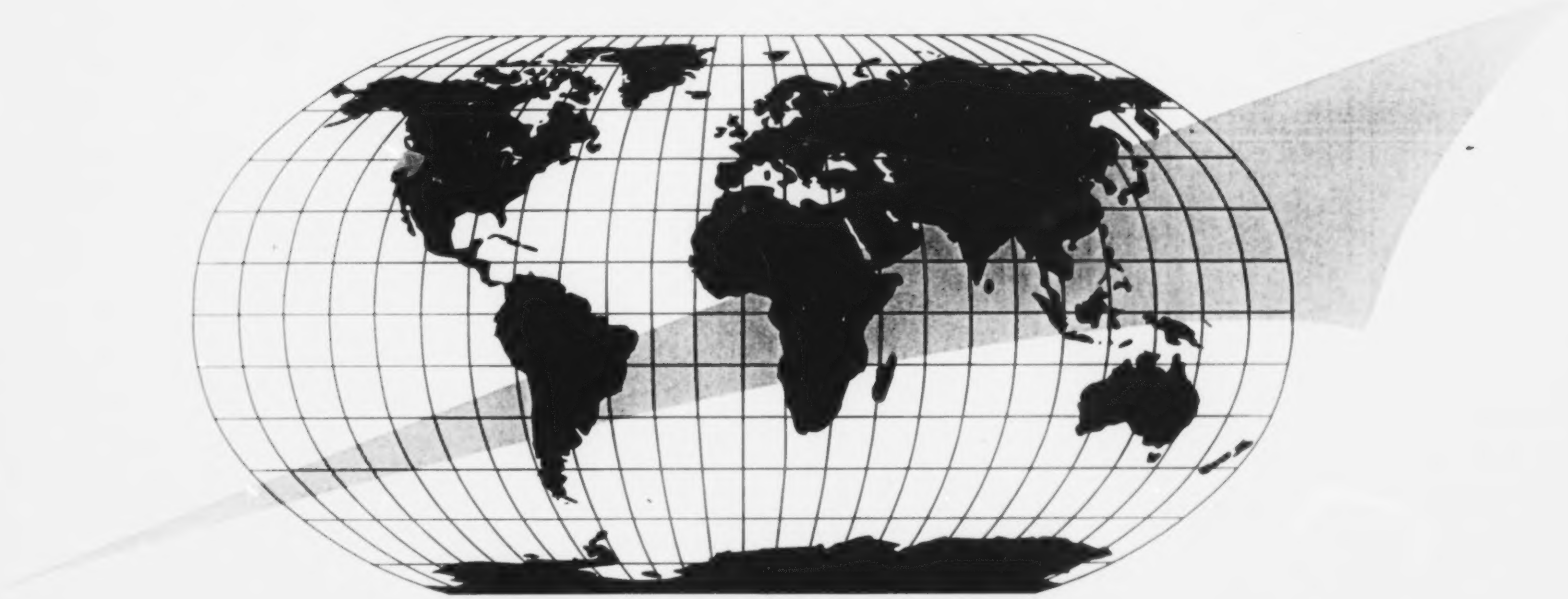
"What are the causes and effects of human movement around the world?" Geographers look at how we get from one place to another. What are the patterns of movement of people, products, and information? What are the forms of transportation and communication? How have people migrated, how have they traded goods, how have ideas spread around the world? Migration, imports and exports, various means of travel, television, and the Internet are all important to the theme of movement.

Regions

"How can places be described or compared?" Geographers divide Earth into regions to study specific topics in more detail. Regions may be categorized in two basic ways: physical and cultural. Physical regions are defined by location, landform, climate, soil, and so on. The Western Hemisphere, the Midwest, the Rocky Mountains, and the tropical zone are examples of physical regions. Cultural regions are differentiated by political, economic, religious, linguistic, agricultural, and industrial characteristics. Countries, states, and cities; nonindustrialized nations; the Muslim world; Latin America; and the corn belt are examples of cultural regions.

Geography

The Art and Science of Place



Name ______________________________ Date __________

Unit 1

1. Create a Center

Work with your friends. Create a resource center in your classroom.

- Ask your teacher where a good place would be. Hang posters, pictures, or maps on the walls. Create a place to store maps you collect and those you make.
- Collect various maps of your area to create an atlas.
- Collect reference books to use during this unit. Find various types of atlases.
- Collect current world almanacs. Find a variety of books on your region.

2. Great Events in Geography

Find out about some important events in geography.

▶ By yourself or in a group, create a time line of them. Illustrate the most important events. Add to your time line as you go.

3. Themes

▶ In a group or by yourself, find pictures in magazines that show

location

place

movement

- Cut them out.
- Put them on a larger piece of colored paper.
- Label each theme.

4. Geography in Literature

Think about a book or story you've read. Describe each place mentioned in the story:

Where is it?

What makes it special?

Choose one of the following:

- ▶ Make a chart that shows the answers to the questions.
- ▶ Draw or paint the place.
- ▶ Draw a map of what happened in the story.

5. "Do You Know the Way?"

Choose a place in your school.

▶ Write or give a friend directions to the place. Your friend will follow your directions and let you know how well you did.

6. Come Travel with Me

Travel is fun! You have a chance to view the world. Learn about a place in the United States that you have never visited. Locate it on a map. If possible, ask someone who grew up there about it. Write to the city, or visit its web site.

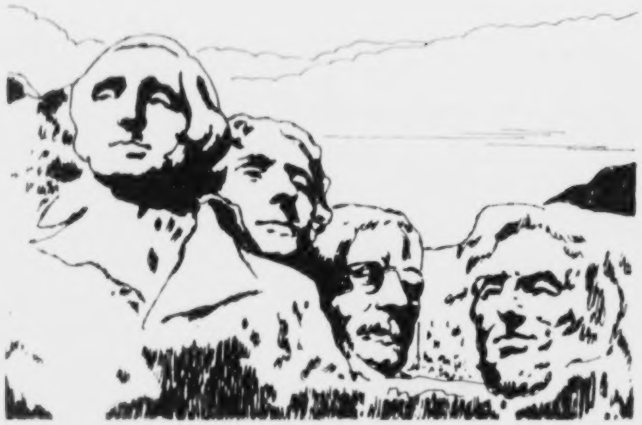
▶ Share your information with your class in

- *a drawing*
- *a story*
- *a comic book*
- *a mural*

7. Geography in Art

Landscape and cityscape artists are geographers.
They observe carefully to paint a place.

Look at one or more landscape paintings.
How do the paintings make you feel?



- ▶ Write a story, poem, or song about the scene.

OR

- ▶ Paint or draw a scene of an area near your home.

8. Fun and Games

- Play Pin the State on the Map. Trace shapes of U.S. states from a map. Cut them out of cardboard. Pass them out to players. Put up a blank outline of the United States, the same size as the one you traced the states from. One person calls the names of the states. AS each state is called, the person who has that state shape pins it to the map. At the end of the game, change states around if necessary.
- Design a floor puzzle. Players choose regions and cut out shapes of their regions. They work together to place areas in the right places on a large sheet of paper on the floor.

9. Immigration to the United States

Find out about your ancestors.

When did they come to this country and from where?

▶ Make a route map that shows the route your ancestors took.

10. The World in Your Closet

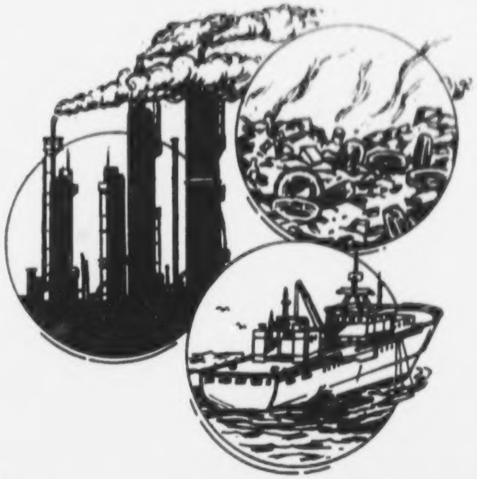
Your clothes come from all over the world. Pull five items of clothing from your closet. Look at the tags to see where each was made.

- ► Alone or with friends, draw or cut out pictures of the items. Pin them to the place on the map where they were made.

11. The Chore of Taking Out the Trash

Collect items that weigh four pounds. Bring them in to class. Let your friends lift them. They will see how heavy four pounds is. In the United States, each person discards about four pounds of trash per day. With your classmates, find out how much that is.

For one day, place the trash you throw out in a separate bag at your house. At the end of the day, weigh your trash on a bathroom scale. Write down the weight. Is it more or less than 4 pounds? Think of ways to cut back.



► Make a poster that lists at least 10 ways you can cut the amount of waste you make. Display your poster in your school lunchroom.

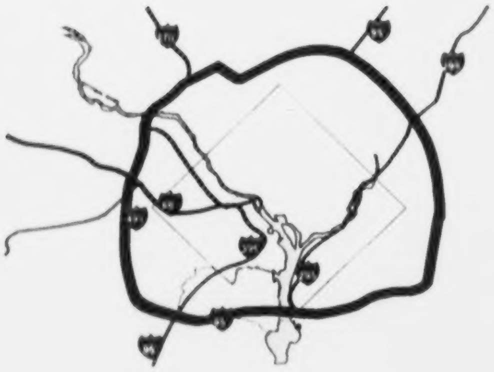
12. Local Fair

You and your friends each choose something about your town you like. Maybe a holiday it celebrates, a famous person, a historical event that happened there. Find out about it.

- ► Create a booth that tells what you learned. Include posters, pictures, maps, recordings or videos. Take turns visiting each other's booths.

13. Home Sweet Home

Information about your town or city is geography. Take pictures or videos of your town or city. Ask neighbors questions about it. Write down or draw what you learn.



Show what you learned:

- ▶ With friends, do a skit for your class.
- ▶ Show your pictures or video; explain them.
- ▶ Put your photographs, pictures, and drawings on a wall.

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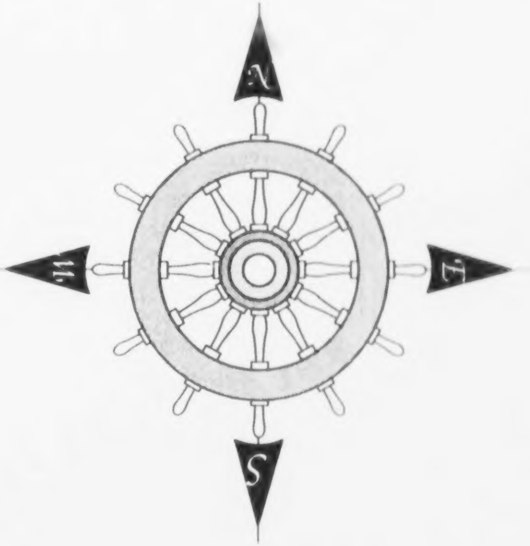
14. Map Parts

Maps are important tools. Look at a map closely. Find the *compass rose* (the item that has N, S, E, and W on it). What is it for?

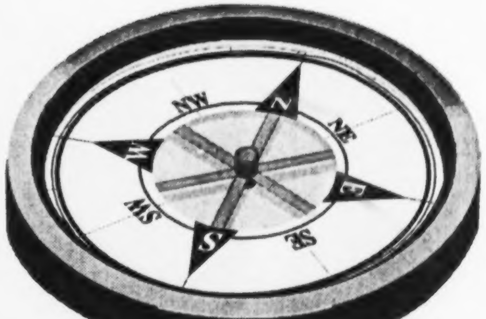
Find the *legend* (the item that shows what the symbols mean). What else do you find interesting?

- ▶ Make a chart of examples of compass roses and legends. Include examples from three maps.



15. Directions

- Show your class how to use a compass. Use signs to mark north, south, east, and west on the walls. (Note: You may need to turn off the electricity in your classroom.)



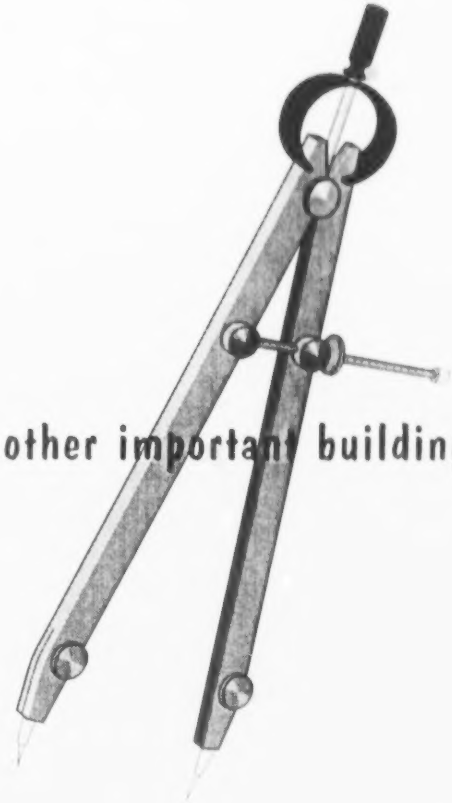
- Make your own compass. Draw a compass rose on a paper plate. Place a small bowl filled with water in the center of the paper plate. Lay a large sewing needle on a bar magnet, its point toward the positive end, for a few minutes. Place a small square of sponge in the bowl of water. Lay the needle on the sponge. The needle will point north. Ask a friend to hold the bowl up. Turn the paper plate so that North on your compass rose lines up with the needle point.

16. Making Maps

- ▶ Make a map of your classroom.

OR

- ▶ Draw a map of your neighborhood.
  Show your house, your school, and other important buildings.



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17. Half Is a Hemisphere

Cut an apple in half going down from the stem. Cut another apple in half going down from the side. If the apples were globes, these four pieces would be *hemispheres.*

Which would be the Northern Hemisphere (the one at the top)? Only one piece will work. Which would be the Southern Hemisphere (the one at the bottom)? Only one piece will work. Which would be the East and West Hemispheres? These two pieces can be swapped.

- ► Attach your apples to a chart. Label the hemispheres.

18. "I'm Late, I'm Late! For a Very Important Date!"

What time is it in your school? What time is it in Tokyo, Japan? What time is it in Greenwich, England? Spin a globe, then close your eyes and stop it. Open your eyes to see the city where your finger is pointing. Write down the name of the city. Close your eyes and spin the globe twice more. Write the names of the cities.

- ▶ Make a chart with the time it was in your school when you started this activity.
- ▶ List what time it was in the three cities you pointed to.

19. Word Search

```
H E M I S P H E R E X Y O E N D N O R T H O G B O X K
W E S R A C D O V X R P L A M P Q Q R S V P Z R L R C
E V O G H E I T H L S P O S O U T H V O L S P L A C O
Q U A T O R V O L U S E R T I M E V O I M P Z C O V M
U T I M V A X I B A T L A R O M B U X L A T L A S V P
A M B U L A X I B I X R O A R E S O P R O S E T X U A
T I M P Q U A T O X E A S M R O S R L E G E G N D I S
O P R W E S R A S P L E G S R O A S P G Q O E V O R S
R O S E V I O L E R E S L A T I T U D E I N N A O K B
A G I S B U R L E E B A Y S O M M R I R O A D T H O S
V O L T E N O L E S T E M P L A T L O G N I R S V T O
```

Word List

- atlas
- axis
- compass
- east
- equator
- hemisphere
- latitude
- legend
- north
- road
- rose
- south
- time
- west

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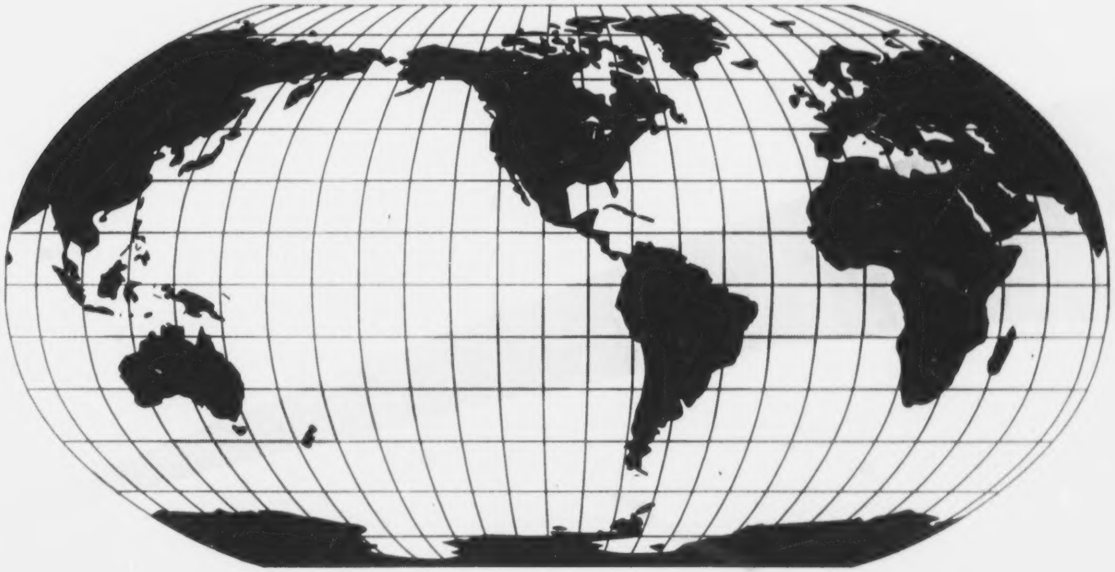
20. Big Finish

Think about everything you have learned about geography.

- ▶ With your classmates, plan a geography celebration.

Geography

The Art and Science of Place



Name ______________________________ Date ___________

Unit 2

Getting Your Bearings

1. Creating a Geography Resource Center

As geographers, you and your classmates will need a resource center well stocked with maps and other reference materials. Work cooperatively with your classmates to assemble a geography resource center in your classroom.

- Talk to your teacher about the best location for your geography resource center. Make a cozy corner or area with a large table so that you can spread the maps out flat. Decide what posters, pictures, or maps you would like to hang on the walls and hang them. If possible, bring in a project cabinet or have some large portfolios in which to store maps you collect and those you make.
- Create an atlas of your region. Collect various kinds of maps of your area, including road maps of various scales (state and city maps), topographical maps, political maps that show various political districts (state, county or city representatives, utility and school districts), census maps, and any other kinds of maps you can find. Check with city and county planning departments to see if they can help you.
- Collect reference books to use during this unit. Find various types of atlases, including world atlases, U.S. atlases, and road atlases. Collect a variety of current world almanacs. Different almanacs provide different statistics, so don't be satisfied with only one. Find a variety of books on your region. Place the books in the resource center in an easy-to-use manner.

Getting Your Bearings

2. Great Moments in Geography

> *For as Geography without History seemeth a carcass without motion, so History without Geography wandreth as a Vagrant without a certain habitation.*
>
> —John Smith, English colonist in America, 1624

As long as humans have lived on Earth, they have explored their world and tried to understand how it works. To begin your study of geography, become acquainted with the people and events throughout history that have unlocked the secrets of Earth.

- ▶ By yourself or in a group, create a time line of great moments in geography. Illustrate some of the most significant events. Add to it as you discover more significant events.

OR

Select a significant moment and find out more about it. Why was the event historic and how did it affect geographic understanding at that time?

- ▶ Write an illustrated minireport about it or create a skit and present it to your class.

Getting Your Bearings

3. Geography's Greek Roots

Where did geography begin? The word *geography* comes from the Greek word *ge*, meaning "earth," and *graphe*, "to describe." While many early civilizations made maps, it was the Greeks who systematically described Earth using scientific methods. For a firm foundation in the study of geography, investigate the ancients and their observations and theories about the world.

The following Greeks all made important contributions to our knowledge of Earth:

Eratosthenes
Strabo
The Pythagorean school
Plato
Oenopides
Pytheas
Aristarchus
Hipparchus

Choose several Greeks from the list or from your own research. Find out what they thought about the shape of Earth and its relationship to the Sun, Moon, and stars. Find out what their major contributions were to furthering geographic understanding.

▶ Stage a dramatization or a talk show interview
in which these ancients discuss and debate their theories.

Getting Your Bearings

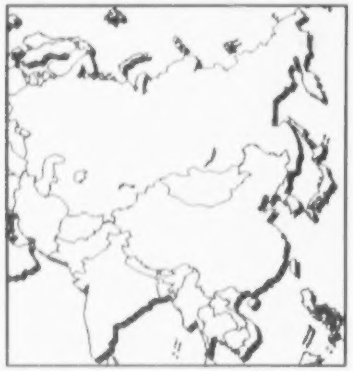
4. Ptolemy

Claudius Ptolemaeus, known as Ptolemy (c. CE 100–170), an Egyptian-Greek astronomer and geographer, developed many principles of geography that we still use today. Find out more about Ptolemy and his observations. Find out what ideas about Earth and its study he proposed, and what conventions he began that have survived through the ages.

▶ Relate your findings to the class as an illustrated biographical booklet or poster.

Getting Your Bearings

5. Geography of the East



The Greeks were not the only ones who studied Earth and the stars. The Chinese and Islamic peoples made advances in astronomy and geography, and had explorers of their own who brought back information about lands outside their domain.

Find out more about the advancements and inventions of the ancient Chinese.

- Choose three and use diagrams to explain the use of each advancement or invention. Include a brief history of its development. OR

Pretend you are one of two famous Chinese explorers, Chang Ch'ien of the Han Dynasty or Admiral Cheng Ho.

- Tell the story of your adventures to your class as though you were telling it to the emperor and his court upon your return. OR

With a friend or by yourself, read Marco Polo's book *Travels* and Ibn Battutah's book of the same title. Where did these two adventurers go? How long were their journeys? What were some of the things they described?

- Record comparisons between the two books in a booklet or give an oral presentation with readings from both books.

6. Geography in the News

Study the information on the five themes of geography in the introduction.

- ▶ In a group or by yourself, create a collage of magazine photographs that depict the five themes in geography. Find pictures to represent each of the five themes, cut them out, assemble them on a larger piece of colored paper, and label each theme. Present your collage to the class and explain how the pictures demonstrate each theme.

OR

- ▶ Make a current events scrapbook that describes the ways the five themes relate to news stories. Every day for a week, find one or more articles from newspapers in which geography plays an important role. Cut out the articles and put them in a booklet, explaining how the event relates to one or more of the themes. Make sure you represent each theme.

OR

- ▶ Listen to a broadcast news report. Choose a news story that relates to one or more of the five themes of geography. Re-create the news story, emphasizing the geographic issues involved. Present your re-creation to your class using maps and other visual aids.

Five Themes of Geography

7. Geography in Literature

Analyze the setting of a book or short story you've read recently by using the five themes. Briefly describe each place visited in the story: Where is it located? What makes it unique? What effects on the environment do humans have? What major forms of transportation are there? Was immigration an important idea in the story? In what physical and cultural regions is the story set?

Choose one of the following:

- Make a chart of the five themes and how they relate to the setting.
- Draw or paint the setting; write captions that describe the five themes.
- Draw an annotated map of the setting.
- Rewrite a few paragraphs of the story to present the setting from a geographic point of view.

Five Themes: Location

8. "Do You Know the Way to San Jose?"

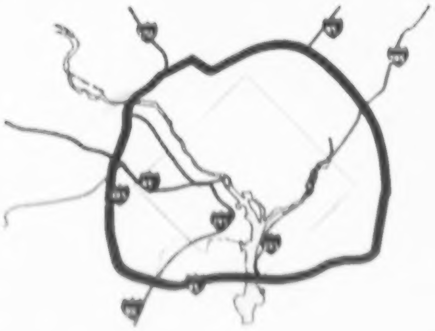
The city of San Jose lies 51 miles south of San Francisco on Highway 101, about 10 miles south of the southern tip of San Francisco Bay. These kinds of directions tell us the *relative* location of a place—that is, where a place is in relation to other places we know. We can discuss the *absolute* location of places according to their latitude and longitude coordinates. In everyday life, we most often use the *relative* location to describe a place, since we do not always know the coordinates or have a map that shows them.

Imagine that your world-traveling Aunt Matilda has just phoned and wants to come for a visit. Choose a city more than 200 miles from yours to be Aunt Matilda's current location. Decide on at least two forms of transportation for her to use, such as planes, trains, ships, cars, taxis, buses, bicycles, roller blades, or foot. Describe exactly what your aunt needs to do in order to arrive at your house. Include such information as the names of the airlines she should take and the names of the airports she will land in, the names of the highways she should use, the directions (north, south, and so on) she should go in, the approximate numbers of miles each leg takes, the names of streets she will use once she reaches your town, landmarks that could help her recognize where to turn, and anything you think will make it easy for your aunt to find your house.

▶ Write a letter to your aunt with step-by-step written directions, create an annotated map for her, or do both.

Five Themes of Geography: Location

9. "Do You Know the Way to Baskin Robbins?"



Choose a place in your city that a friend of yours does not know. Describe to your friend how to get there, including the best type of transportation to take, the names of streets and approximate travel distances, ways to turn at intersections, and any helpful landmarks.

► Write the directions for your friend to follow to the site. Your friend will let you know how well you did.

Five Themes: Place

10. Come Travel with Me

Travel is fun! You have a chance to view the world from points of view other than your own. You might see new landforms or experience an unfamiliar climate. People may speak languages different from your; the architecture may be different from that in your town. Of course, seeing a place firsthand is best, but if you can't travel to a new place personally, you can travel there in your mind by reading about it.

Learn about a place in the United States that you have never visited. Locate it on a map. If possible, interview someone who grew up there and ask what the people who live there are like. Write to the city or visit their web site.

▶ Create a travel brochure about the place. Tell people why they should visit the place by describing some interesting natural and humanmade attractions. Find pictures in magazines or postcards, or draw or paint some of the landmarks.

10. Come Travel with Me (continued)

OR

- Prepare an "Armchair Geographer's Trip" for your class. Include where your place is located on a map and how to get there from your home town. Teach classmates some of the local language or a dialect, a song, folk dance, or craft. You could tell about a special historical event or an environmental issue.

OR

- Pretend you are a government representative with the job of encouraging businesses to locate in your place. Write a letter to a company (you decide what type). Give information you think would encourage a company to open an office or a factory in your place. Include such things as natural resources, the transportation available for people and goods, statistics about the labor market, the political climate, taxes, and so on.

Five Themes: Place

11. Geography in Art

Landscape and cityscape artists are geographers, as well. They observe their environment carefully, trying to capture the unique aspects of their subjects.

Spend some time viewing one or more landscape paintings, preferably of an area near your home. What characteristics did the artist choose to emphasize? What feeling about the place does the painting give you?

- Write a story, poem or song about the scene.

OR

Study a landscape painting of your choice. Does the artist try to paint a scene with photographic accuracy, or does she use artistic expression to suggest the forms?

- In the same style used in the painting you observed, paint or draw a scene of a favorite area near your home.

12. Fun and Games

Adapt these games to any area you are studying.

- **Play 20 Clues.** Distributes names of geographic areas to all those playing. Using an almanac, atlas, or other sources, players each write twenty clues about their assigned areas, including clues about location, physical characteristics, vegetation, history, capital, agriculture, ethnic groups, famous people, and other interesting information. They organize the clues from hardest to easiest. Players take turns giving clues while others try to guess the place silently, writing down the answer and the number of the clue on which they correctly guessed. Play continues until the players have all guessed the area, then the next person gives clues.
- **Play Capital Bingo.** Make two sets of bingo cards, one with states or countries in the squares in random order and the other with capital cities. Players use the same types of cards. The caller calls out the states and the players mark the capital cities on their cards or vice versa. First player to legitimately call out "Bingo" becomes the caller or wins a prize.
- **Design a floor puzzle.** Each player has a letter-sized piece of paper with the name of a geographical place written on it. Players cut out the shapes of their regions and add other appropriate information such as name and location of capital, rivers, mountains, deserts, major cities. Players collaborate to place areas in appropriate locations on a large sheet of paper on the floor. Compare your completed puzzle map to a published map. While the scale will be different, the spatial relationships should be the same.

Five Themes: Movement

13. Immigration to the United States

The United States has more citizens with immigrant ancestors than it has American Indians. The United States continues to attract people from other countries.

Find out about classmates' ancestors. When did they come to this country and from where?

▶ Make a route map that shows the lines of immigration of classmates' ancestors to regions of the United States. Individually list the factors that caused your ancestors to immigrate.

OR

During certain times in history, there was considerably more immigration to the United States than at others. Choose one of the time periods below. Find out where people came from during those years, why they came, how they came, and where they settled.

Colonial America	*1820–1860*	*1900–1920*	*1960–present*

▶ Create maps and charts to display your information.

OR

Choose a country different from the United States and pretend you are immigrating from there. Why are you moving to the United States? Decide what route you will take and how you will travel. Where will you land? Where will you settle? What will you do?

▶ Write a journal that chronicles your voyage from start to finish.

14. The World in Your Closet

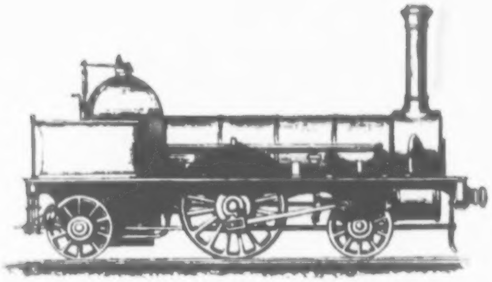
Your closet contains a lesson on world trade. Americans import $40 billion worth of clothing per year from around the world. What do we buy and how does it get here?

Ask all your classmates to go through their clothing and footwear, listing each item and the nation from which it came. Compile the lists and locate the places on a world map. Make a chart that categorizes the nations by continent. Select several items of clothing and brainstorm the possible types of transportation used to bring them from their origins to your closets. List the stages of the journey for each item, including foreign and domestic port cities and specific places through which the items may have passed. Analyze why Americans buy so many imported clothes and footwear when many of these items are also made in the United States. Consider why you each bought the items. List the reasons.

► Create a visual display of the information you collected.

Five Themes: Movement

15. Transportation and the Industrial Revolution



With the American Industrial Revolution came a demand for more goods. To make and sell more goods, factories needed more raw materials and goods delivered more quickly. They also needed more workers, so many people moved to the cities that had factories. This pressure stimulated advances in transportation technology.

Find out about the various improvements in transportation in the early 1800s. Choose one of these methods of transportation and research it. Find out where the improvements were made and how they affected patterns of transportation.

- ▶ Share what you have learned in a newspaper article or in a detailed poster. OR
- ▶ Write a story about a family traveling on one of the new transportation systems. Describe where the family was going, what it was like traveling, and how long it took to arrive at their destination. OR
- ▶ Draw a thematic map that shows the routes of the various transportation systems and when they were built.

Five Themes: Movement

16. Cultural Diffusion and All That Jazz

As a drop of ink spreads out and eventually colors all the water in a glass, so an idea or element from one culture can spread out, or diffuse, to another culture. Because of cultural diversity, the United States has benefited from an almost constant process of cultural diffusion during its history. An example of cultural diffusion is the evolution of jazz. From its original capital in New Orleans, it has spread throughout the world.

Trace the diffusion of jazz, from its origins through its popularity worldwide. Who were some of the famous musicians that helped shape its creation and evolution? Where did they perform and how did the movement of jazz parallel the migration of African Americans within the United States?

- Draw an annotated map that tells the story of jazz or create a presentation that combines maps with music.

OR

Choose a jazz musician or composer and research your choice. Where was she born, where did she perform, what did her music sound like?

- Create a multimedia biography to present to your class.

OR

- By yourself or with some other musicians, give a jazz concert for your class.

Five Themes: Human and Environmental Interaction

17. "Think Globally, Act Locally"

While we may agree that we need to maintain a healthy environment, it is sometimes difficult to know how to do so. There are ways, however, to make a difference in your community.

Find out about the environmental issues that face your community. Choose one and research it. Call the planning department of your local government to find out more about it and whether there are any programs to deal with the problem. Find out if the local governing board will be making any decisions soon about the issue and attend a council or board meeting, if possible.

▶ Write a letter to your board or council member expressing your views on the issue. **OR**

Find out if there is a local chapter of an environmental group, such as the Audubon Society, the Sierra Club, the National Wildlife Federation, or a local group, and volunteer. Spend an afternoon working with members.

▶ Write a journal or tell your class about your experiences and what you thought about them.

OR

Research a global environmental problem, such as global warming, acid rain, or deforestation. How do actions in the United States, specifically in your community, affect the environment elsewhere in the world?

▶ Write a proposal for a new law that will improve the environment and give a speech to your class advocating the legislation.

18. The Chore of Taking Out the Trash

In the United States, each person discards about 4 pounds of trash per day, or a half a ton per year. This amount is approximately twice as much as people in western Europe and Japan discard. Local governments in the United States must deal with their ever-increasing waste. Landfills, recycling programs, and energy-producing incineration plants are some of the methods communities use to dispose of their trash.

Contact the government agency or private business responsible for waste disposal in your community. Find out how your community deals with its trash. Does your community have recycling programs? Is it economically beneficial?

- ▶ Relate your findings in a flow chart or diagram that shows what happens to the waste from your family. **OR**

Look into waste-to-energy plants. What communities in the United States have these plants? Have they been successful? What community problems have the plants caused?

- ▶ Present your information in an oral or written report. **OR**

Another approach to solving the problem of too much waste is to reduce the amount of waste produced. Look into ways to reduce packaging before it becomes waste. Find examples in your community.

- ▶ Make a poster that lists at least 10 ways you can reduce the amount of waste you generate. Display your poster in your school lunchroom.

Five Themes: Human and Environmental Interaction

19. Who's Who in the Age of Exploration

Many adventurers and explorers have gone down in history for their "discoveries" during the late fifteenth and sixteenth centuries, the Age of Exploration. Some of these adventurers added a great deal to European geographic knowledge at the time. However, many of them also destroyed the native peoples and their cultures, and exploited the lands they discovered.

Learn about the following explorers or choose your own:

Henry the Navigator
Christopher Columbus
Amerigo Vespucci
Vasco da Gama
John Cabot
Antônio de Abreu
Juan Ponce de León
Vasco Nuñez de Balboa
Hernán Cortés
Ferdinand Magellan
Giovanni da Verrazano
Francisco Pizarro
Jacques Cartier
Sir Francis Drake
Sir Walter Raleigh
Henry Hudson
Samuel de Champlain
Abel Tasman
René-Robert Cavelier de La Salle
James Cook
George Vancouver
Sir Alexander Mackenzie
Meriwether Lewis
William Clark

▶ Write a Who's Who in the Age of Exploration. Make a list of the top 5 explorers and worst 5 exploiters, giving your criteria for how they earned their ranks. Give a brief biographical description of each person and their significance to history and geography. Discuss not only where they went, but how their actions affected the land and people who lived there.

20. Travel Fair

With your class, decide whether to study states or regions of the United States. Then decide which groups or individuals will study which areas. Learn about the characteristics of your assigned region. Are there interesting natural landmarks people would like to visit? What humanmade attractions would people enjoy visiting? Are there yearly festivals that highlight regional music and dance?

▶ Share your findings in a travel fair by creating a booth that represents your region. Include posters, pictures, maps, travel brochures, recordings or a video, regional foods, and any other items that will give your classmates a flavor of your region. On the day of the fair, take turns being presenters and visitors, or invite another class or parents to visit your fair. As visitors stop at your booth, talk about your region to convince them to visit the region that summer.

Five Themes: Regions

21. American Indian Cultural Regions: Then and Now

The tragic story of the degradation of American Indian cultures due to European interference is well known. Examine American Indian cultural regions from a geographical point of view. Find out where various nations lived before 1500 and where they live today. From primary sources or personal interviews, find out about American Indian cultures and ways of life in 1500, how they changed through history, and how they have adapted to twentieth-century life. Read their stories and myths. Relate what you have learned to your class in one of the following ways:

- Draw a series of maps that shows how the homelands of various nations have changed over the centuries.
- Create a presentation for your class about one American Indian culture, where and how the people lived before 1500, and where and how they live today.
- Read aloud a legend or story from that culture that demonstrates how the culture relates to the natural environment.
- Write a real or fictional family history that chronicles the changes in where and how the family lived through the history of their tribe up to the present day.
- Assemble a collage of photographs and drawings that tell the story of the people you have chosen.

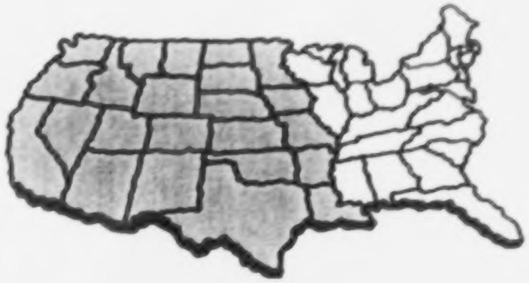
Five Themes: Regions

22. Comparing Regions of the United States Using a Cartogram

A cartogram is a visual way of displaying statistical geographic information. It is a cross between a graph and a map. You can see the differences and similarities among regions by making cartograms that compare them.

Before you start, divide the United States into regions, that is, groupings of states with shared characteristics. Then decide what information you wish to compare. You may want to make a number of cartograms for a variety of data, such as area, population, and amount of arable land.

▶ Make a cartogram for each type of information you choose.
Display the finished cartograms for the class.



22. Comparing Regions of the United States Using a Cartogram (continued)

To Make a Cartogram

1. Gather data from almanacs or government web sites for each region and total the results.
2. Determine a scale for grid paper. For example, if you are doing population, you could use one square unit per million people.
3. Cut out your regional area from grid paper according to the data. Keep the shape about the same, but vary the sizes according to the data. For example, if you are doing population, the Mid-Atlantic states with New York will be very large and the Rocky Mountain states will be very small. Use different colors to distinguish the states within the regions, if you wish.
4. Paste the regions to a large piece of paper or poster board in their relative locations to form a map.

23. Home Sweet Home

Study your community as though you were an impartial geographer. Investigate your area using the five themes of geography. Take pictures or videos, interview residents, and record your field observations. Make sure you have the following information for each theme.

Location: *What is your city's latitude and longitude and in what hemisphere is it? What is the elevation? What is its relative location in relation to other cities or natural landmarks?*

Place: *What makes your city unique? What physical features, humanmade landmarks, and buildings would you like to show a visitor? What are the people like?*

Movement: *What are the major forms of transportation in your area and what is transported? How and why did people move there?*

Human and Environmental Interaction: *How have people changed the local environment or adapted to it? What are the major environmental issues facing your community?*

Regions: *To what physical and cultural regions does your city belong?*

Present your findings to the class as one of the following:

- a live presentation with slides or videos to illustrate the themes
- a videotaped documentary
- a wall display with photographs, pictures, drawings, and written explanations
- a multimedia show set to music.

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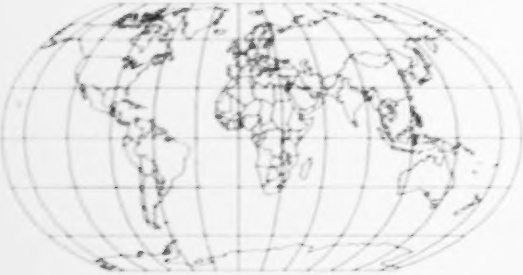
Cartography

24. Introduction



> *The character and technology of mapmaking may have changed over the centuries, . . . but the potential of maps has not. Maps embody a perspective of that which is known and a perception of that which may be worth knowing.*
>
> —John Noble Wilford, from *The Mapmakers*

Maps are one of a geographer's most important tools for understanding Earth in spatial terms. They are a picture of Earth that describes certain information about one area. The art of making maps is called *cartography,* and map makers are called *cartographers.*

To be able to use maps well, you will need to become familiar with the following:

types of maps
direction
scale
hemispheres
latitude and longitude
projections

- ▶ Make your own *Dictionary of Geographic Terms.* List the terms that are new to you or that you want to understand further. You might want to use diagrams to illustrate some of the terms. Add to the dictionary as you find out more about cartography. OR
- ▶ Make a poster and illustrate something about each topic in the list. Hang your posters around your room for you and your classmates to enjoy and use as references.

25. Types of Maps

Find out what each of the following is and how it is used:

- *political maps*
- *physical maps*
- *road maps*
- *thematic (or topical) maps*
- *physical thematic maps*
- *cultural thematic maps*
- *weather maps*
- *shaded relief maps and topographic maps*
- *time zone maps*
- *historical maps*
- *atlas*
- *legend*
- *scale*
- *projection*
- *route maps*

▶ Go through your history or social studies text and find samples of the various types of maps. Make a chart of the different maps you find, listing what kinds of information each type gives you.

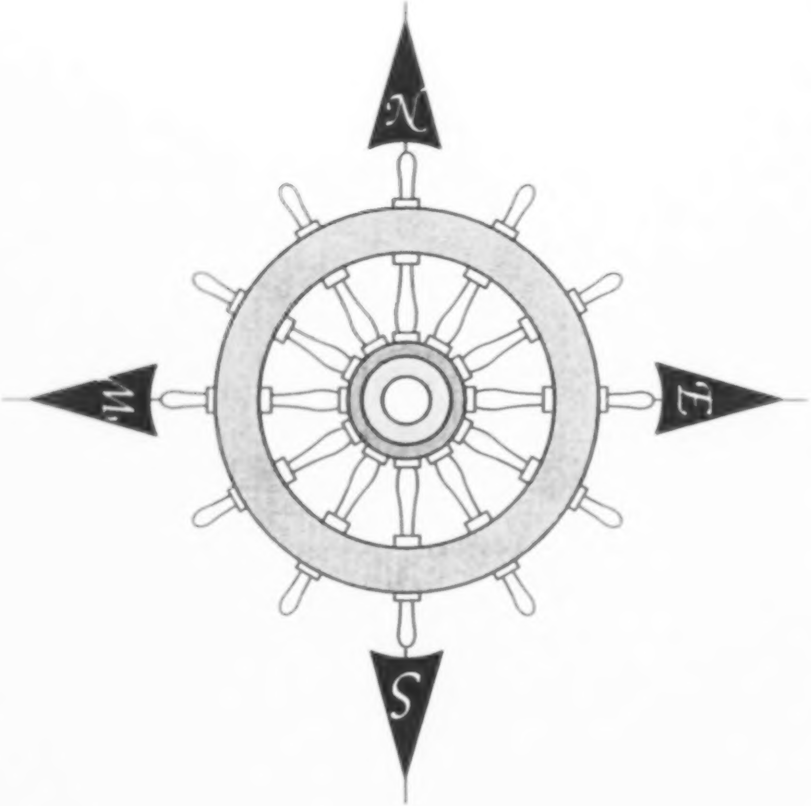
▶ Look through a variety of atlases in the geography resource center or your library to find thematic and several other types of maps of your hometown. List things about your hometown that you learned from these maps.

Cartography

26. Direction

Find out what the following are:

- *cardinal directions*
- *compass rose*
- *Earth's axis*
- *intermediate directions*
- *magnetic compass*
- *magnetic declination*
- *magnetic north*
- *North Pole*
- *South Pole*
- *true north*

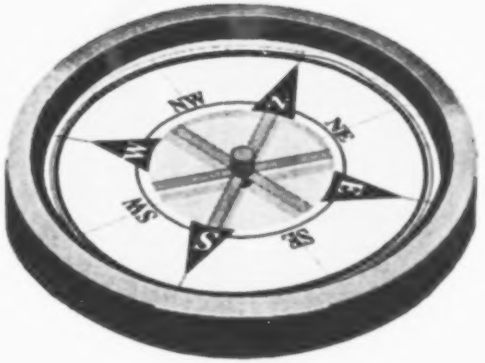


▶ Demonstrate for your class how to use a magnetic compass. Then use a compass to determine the four cardinal and four intermediate directions within your classroom. Use signs to mark the directions on the walls. (Note: You may need to turn off the electricity in your classroom, since electricity creates its own magnetic field.)

OR

26. Direction (continued)

Find out more about Earth's magnetic field, magnetic declination, and the changeable nature of the magnetic poles. Research the current magnetic declination for your city.



- Make a sign of the declination for the geography resource center. Use diagrams and maps to describe what you have learned about Earth's magnetic field.
- Make your own compass. Draw a compass rose on a paper plate. Place a small bowl filled with water in the center of the paper plate. Magnetize a large sewing needle by laying it on a bar magnet, its point toward the positive end, for a few minutes. Float a small square of sponge in the bowl of water. When the needle is magnetized, lay it on the sponge. The needle will turn toward the north. While a friend holds the bowl up, turn the paper plate so that North on your compass rose lines up with the needle point.

Cartography

27. Which Way Is Up?

A map's orientation often makes a difference in our ability to recognize specific locations. It can also tell us something about the worldview of the people who use the map. We are all used to viewing north-oriented maps. See how maps oriented in a different direction change your perception of the world.

Find some maps from medieval Europe and research the worldview at that time. Why are many of the maps oriented toward the east? How was the worldview of medieval Europe different from the worldview of the Greeks?

- ▶ Show your class some medieval European maps as well as Greek maps and lead a discussion about the similarities and differences.

OR

In what ways do you think our relationship with South America would differ if maps were south oriented? In other words, if a map were turned upside down so South America would be above North America?

- ▶ Write a paragraph that expresses your views.

Cartography

28. Scale

Find out what the following mean and how each concept is used.

scale *large-scale map* *small-scale map*

- ▶ Make a map of your classroom. Determine the appropriate scale for the size of paper you will use and the size of the classroom. You will need a measuring tape, a ruler, and a paper and pencil.

OR

- ▶ Draw a large-scale map of your neighborhood that shows your house, your school, and a few other important buildings. Include a compass rose and place every element in the proper relationship to the other elements.

OR

Choose one large-scale and one small-scale road map of your area. Cut a strip of paper, copy the scale onto it, and use it like a special ruler to measure the distance between the following:

your house and five different places in your city
your city and five different places on the map.

- ▶ Make a chart that shows the distances.

Cartography

29. Hemispheres

Find out what the following mean and how they are used in geography:

hemisphere
equator
Eastern Hemisphere
Northern Hemisphere
Southern Hemisphere
Western Hemisphere
the Prime Meridian

▶ Make a chart of the four hemispheres. Remember that a place will lie in two hemispheres at once, either the Northern or Southern and either the Eastern or the Western. Find at least four cities, each of which lie in a different combination of hemispheres, and list them on the chart.

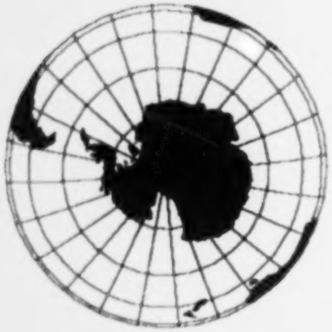
OR

Make observations of the hemispheres on a globe and on a world map. Using thematic world maps, compare and contrast the hemispheres according to features, such as land mass, heights of mountains, frequency of deserts, human population, number of countries, and others you find interesting.

▶ Create a guessing game for your class, "Name That Hemisphere," using the information you gathered.

Cartography

30. What's It Like on the Bottom of the Earth?



Much of the geographic information as we know it was developed in the Northern Hemisphere. People used to wonder if people had to stand on their heads at the South Pole. While that possible difference in the hemispheres has been settled by Sir Isaac Newton, there are actual differences between the Northern and Southern Hemispheres based on their relative locations. Find out more about these differences and how people in both hemispheres adapt to them.

Does the water really swirl out of a drain in the opposite direction in the Southern Hemisphere? Investigate the *Coriolis effect*, the effect of Earth's rotation on its surface. Find out how the Coriolis effect determines wind patterns and how these patterns affected sailing in earlier centuries.

- ▶ Use labeled diagrams and demonstrations with a globe to explain the effect to your class. **OR**

Because Earth's axis tilts, sunlight hits the two hemispheres differently. Research why we experience seasons, and how and why those seasons are different in the Northern and Southern Hemispheres.

- ▶ Make a calendar that shows the seasons of the Southern Hemisphere. **OR**

Read about the adventures of Robert Peary, Matthew Henson, and the Inuit team who were the first to reach the North Pole, and Roald Amundsen, who was the first to reach the South Pole.

Cartography

31. Latitude and Longitude

Latitude and longitude coordinates give every place on Earth a unique address. The imaginary lines also allow us to compare different places and recognize relationships between them. Add these tools to your geographic tool box and explore their varied uses. Find out about the following:

- *latitude*
- *longitude*
- *degrees*
- *parallels*
- *meridians*
- *International Date Line*

▶ Demonstrate the idea of hemispheres, latitude, and longitude to your class using oranges. Slice the oranges, some along lines of latitude and some along lines of longitude. Point out some of the important differences between latitude and longitude. Which lines are the same length and which are different lengths? How far do the measurements go on each type of line? How do they look different on a polar map? Point out the similarities, as well. Eat the oranges and enjoy!

OR

▶ Using a drawn or copied map of the world, draw the line of latitude and the line of longitude that run through your city. Label your city on the map and add at least ten other cities within 5° of your city's latitude and five other cities that lie within 5° of your city's longitude. Remember, latitude stays within the same hemisphere. Longitude lines change hemispheres at the poles (that is, 100° W longitude becomes 100° E longitude at the North and South Poles).

Cartography

32. "I'm Late, I'm Late! For a Very Important Date!"

What time is it? People all over the globe ask that question and schedule their days based on time. School, offices, factories, buses, stores, movies, telephone rates—almost all of what we call the modern world runs according to what time it is. But why is time different in different places and how did we come to have time zones?

Find out why the Prime Meridian runs through Greenwich, England, and how it relates to time zones.

- ▶ Write a news article about the establishment of the Prime Meridian, including when it was established and the reasons for establishing it. **OR**

Find out the average speeds (rounded to the nearest ten miles per hour) for various modes of transportation. Then, plot your course through at least ten cities around the world, ending up back at your own city. Calculate the distance of each leg of the journey (rounded to nearest 100 miles for ease of calculation.)

- ▶ Create a global goose chase. Players start at your city at a certain time, with a goal to travel to each city you investigated by the means of travel you assign, then to return to your city at a given time. Give them the destinations, the distances between the cities, the modes of transportation they must use to get to each. Then let them calculate their way around the world to arrive back at home at the correct time.

Cartograrphy

33. Topographic Map Reading

Contour lines follow the same elevation along the features of Earth. If you walk along a contour line, you never go down- or uphill.

If possible, get a topographic map that shows your school and home. Check with local outdoor equipment or map stores. You can also call the United States Geological Survey, USGS), at 1-800-HELP-MAP, or order off the Internet at mapping.usgs.gov/esic/toorder.html. Use the map to determine the elevation of your home, your school, and at least eight other sites around your neighborhood.

- ▶ Draw a cross-sectional map (not to scale but in the same relationships) of your area that shows the changes in elevation. OR

Use the topographic map to plot a course for a hike of at least 3 miles. Consider the amount of time it will take based on the steepness of the trail. A rule of thumb is 3 miles per hour on an easy trail with no pack and about 1.5 miles per hour on steep terrain. Follow the trails or roads marked on the map and note landmarks along the way.

- ▶ Lead your class or friends on the hike.

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Cartography

34. Map Projections

Globes are the most accurate and realistic maps of Earth. Because Earth is round and paper is flat, printed maps give a distorted representation of Earth. Different map makers through history have tried to improve maps by developing different *projections,* or ways of transferring features of Earth onto a flat map. Find out about the following projections:

cylindrical
mercator
azimuthal
sinusoidal
robinson

You can usually find the type of projection listed on a map in the legend or near a corner.

Find examples of different types of projections.

- ▶ Use copies of various maps to make a booklet that describes the ways different projections affect the size and shape of the continents.

OR

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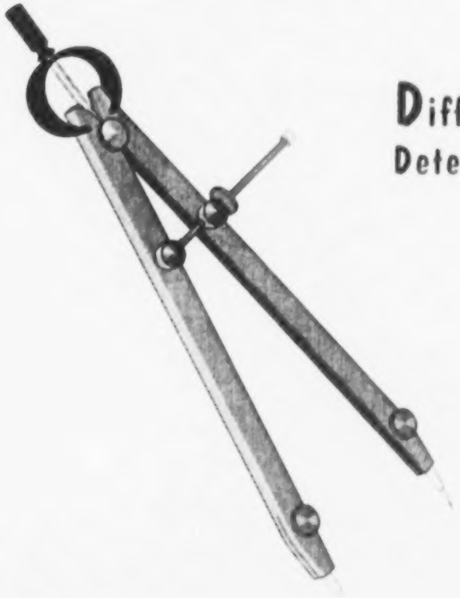
Cartography

34. Map Projections (continued)

Find out more about the Mercator projection and the man who devised it. What significance did it have in history and how did it further geographic exploration?

- ▶ Create a skit that dramatizes the event.



OR

Different types of projections are useful for different purposes. Determine the best uses for the different types of projections.

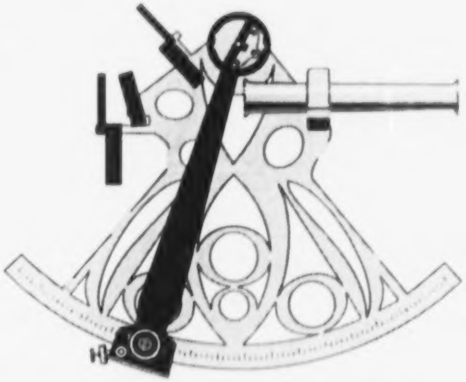
- ▶ Make a chart that lists who might use the various projections and the advantages and disadvantages of each.

Cartography

35. Technology

Many technological advances have made further exploration possible and increased geographic knowledge. Choose one of the following inventions. Find out who invented it and when and how it helped further our understanding of Earth.

magnetic compass
quadrant, sextant, and backstaff
telescope
no. 4 marine chronometer
aerial photography
global positioning systems

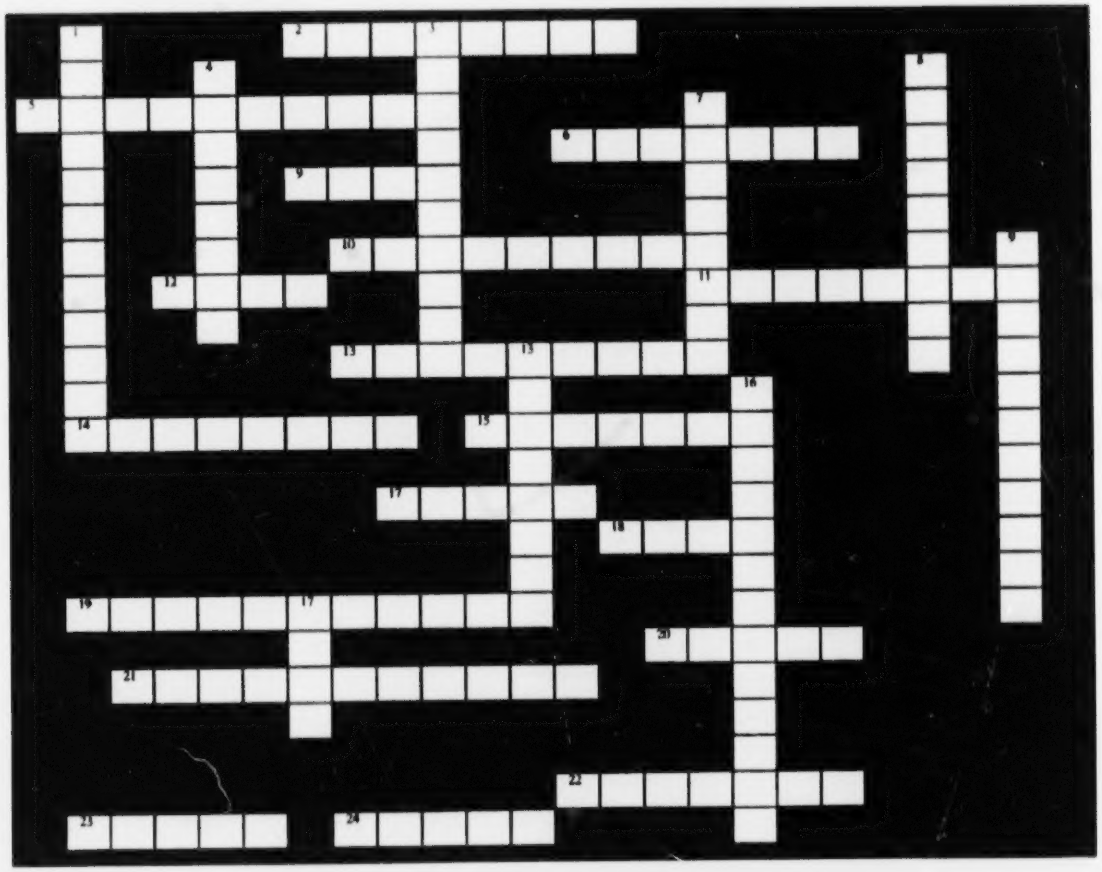


▶ Give an oral history and demonstration of its use and importance to the class, using the actual instrument, if possible, or diagrams.

Cartography

36. Crossword Puzzle

(see next page for clues)



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Word List

- atlas
- axis
- azimuthal
- cartographer
- compass
- equator
- hemispheres
- large scale
- latitude
- longitude
- mercator
- parallel
- physical
- political
- Prime Meridian
- projection
- road
- robinson
- rose
- sinusoidal
- thematic
- time
- topographic
- true north
- weather

Cartography

36. Crossword Puzzle (continued)

Across

2. A map that shows natural features, such as mountains, rivers, lakes, and oceans
5. The representation on a plane of Earth's surface
6. Imaginary line circling the globe halfway between the North and the South Poles
9. What Earth rotates on
10. Using __________ equidistant projection, the distance between two points on a straight line can be measured accurately.
11. Imaginary lines used to measure degrees north or south of the equator
12. A map that shows tourist attractions, types of roads, railroad crossings
13. A map that shows cultural features, such as the outlines of countries, states, and cities
14. A type of projection in which the shape of the continents and directions are distorted, but the distortions are balanced
15. A map that shows precipitation and cold fronts
17. A book of maps
18. Lines of longitude are used to divide the world into 24 __________ zones.
19. A map that shows elevation contours
20. A map that shows a small area in detail
21. All the lines of longitude, but only 1 line of latitude divide Earth into __________
22. An instrument used to determine direction
23. You and your friends find yourselves on Main Street of Anytown, USA, at lunchtime with only a guidebook to help you locate a restaurant. It says the restaurant is at the west end of Main Street on the south side of the street. Quickly remembering your geography class, you face your shadow and point your __________ arm toward west. (Note: In order not to give it away in this and the next clue, the first letter of this word may start in the first or second square.)
24. As you approach the end of Main Street, you look for the restaurant on the __________ side of the street.

Down

1. A person who makes maps
3. A type of equal area projection in which the shape of the continents and directions are distorted, but the size of the continents in relation to one another are correct
4. A type of conformal projection that distorts the size of areas, but the shape and directions are correct
7. Another name for a line of latitude
8. Imaginary lines running from the North Pole to the South Pole
9. The difference between true north and magnetic north
13. A map showing specific kinds of information
16. The line at 0° longitude
17. A symbol on a map that shows how the map is oriented in relation to the directions; a compass __________
18. Some degrees different from magnetic north, the point of 0°N latitude

Applying Geography

37. Careers in Geography

> *"You're the only geographer I've ever met," someone accosted me not long ago. "You must belong to a vanishing breed."*
>
> *I assured the fellow that I was not about to take my place with the pterodactyl. Geographers ply their skills and training as city and county planners; teachers in elementary grades and high schools; college professors and scholars; military planners (General Augusto Pinochet of Chile happens to be a geographer); administrators, department heads, deans, managers; foreign-service officers and diplomats; researchers in think tanks; CEOs of corporations; environmentalists; astronauts and cosmonauts; and cartographers, especially high-tech computer mapmakers now in huge demand and short supply.*
>
> —George J. Demko, "Why in the World"

Geography is the basis of a wide variety of careers. Investigate some careers that might interest you and find out how a background in geography could help you get there.

Choose a career field listed in the quotation or another related field and interview someone working in that field. Find out why your interviewee chose the career, how she likes it, the academic background he has, and how a background in geography could fit into that career path.

- ▶ **Share your experiences with your class as an oral report or in a re-creation of the interview with a partner.**

OR

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Applying Geography

37. Careers in Geography (continued)

Pretend you are finishing a degree in geography and are looking for work.

- ▶ Write a letter asking for employment in a career field in which geography is a suitable background. Describe how your studies in geography would help in your work.

OR

Telephone, write, or email, a professor of geography at a local college. Tell her or him you are thinking of geography as a field of study and you want to know what careers are possible for geography majors. Discuss what specific classes you would need to take for various career options.

- ▶ Display the information in a diagram or chart.

Key

Unit 1 and 2, Activity 2: Time Line

Following are some events you may want to guide your students to include on their time lines.

BCE

Great Pyramid of Giza in Egypt aligned exactly north-south and east-west
Oldest known world map drawn on clay in Babylonia
Pythagorans teach Earth is a sphere
Eratosthenes fairly accurately calculates circumference of Earth
Hipparchus, Greek astronomer, first uses latitude and longitude
Chang Ch'ien of the Han dynasty explores Central Asia

0 to 1000 CE

Pliny the Elder, Roman scholar, writes *Natural History*
Claudius Ptolemaeus (Ptolemy) publishes *Geographia* in Alexandria
Magnetic compass used in China
First Chinese silk maps using grid coordinates
Vikings reach Newfoundland

1000 to 1500 CE

Marco Polo travels through China and the East
Ibn Battutah writes *Travels* about his experiences throughout the Muslim world, China, and Russia
Ptolemy's *Geographia* republished in Europe
Admiral Cheng Ho explores the Indian Ocean for China
Pierre d'Ailly writes *Imago Mundi*, leading Christopher Columbus to believe Earth is much smaller than it is
Bartolomeu Dias sails around the tip of Africa
Christopher Columbus sails to the Americas

1500 to 1600 CE

Martin Waldseemüller map names "New World" after Amerigo Vespucci

Vasco Nuñez de Balboa sights Pacific Ocean

Magellan's ship finishes its voyage around the world commanded by Juan Sebastian de Elcano

Jean Fernel, French physician, accurately calculates the length of a degree of latitude

Dutch cartographer Reiner Gemma Frisius proposes that longitude can be determined by comparing clock time to the sun's position

Gerardus Mercator develops a new type of map projection with straight parallel lines of latitude to assist sailors in navigation

Nicolaus Copernicus proposes that the Sun is at the center of the solar system with Earth orbiting the Sun and revolving on its axis daily

Mercator uses the word *atlas* for the first time

1600 to 1800 CE

Hans Lippershey invents telescope that Galileo Galilei uses to support theory that Earth revolves around the Sun

Abel Tasman navigates around Australia and discovers New Zealand

Sir Isaac Newton proposes universal laws of gravity

John Harrison's marine chronometer wins prize from British Parliament for accurately determining longitude

Louisiana Purchase doubles size of the United States

1800 to 1900 CE

Robert Fulton's steamboat changes transportation times and routes

Oregon Trail, opened by Jim Bridger, leads pioneers to west coast of United States

British, including David Livingstone, Sir Richard Francis Burton, John Speke, Sir Henry Stanley, Mary Kingsley, explore Africa

"Golden Spike" completes first transcontinental railroad in United States

Suez Canal opens, engineered by Ferdinand de Lesseps

Mont Cenis Tunnel, the first major railway tunnel, completed in the Alps

United States Geological Survey established

Orient Express makes its first run from Paris to Constantinople

1900 to 1950 CE

First successful airplane by Wright brothers
Robert Edwin Peary and Matthew Henson reach North Pole
Roald Amundsen reaches South Pole
Assembly line production of the Model T brings about new era of transportation
Greenwich Meridian accepted internationally as Prime Meridian
Panama Canal opens
Treaty of Versailles, ending World War I, changes world map
German oceanographic ship *Meteor* uses sonar to discover the Mid-Atlantic Ridge
Planet Pluto discovered
Jacques Cousteau invents the Aqua-Lung, or scuba (self-contained underwater breathing apparatus), opening further exploration of the sea

1950 to present

Sir Edmund Hillary and Tenzing Norkay climb Mount Everest
Sputnik I, first space satellite, is launched by USSR
Yury Gagarin becomes first man in space; Alan Shepard becomes first American in space
Berlin Wall constructed
Aswan Dam on Nile River is completed
Neil Armstrong sets foot on the moon
Celebration of first "Earth Day," designed to increase environmental awareness
Soviet *Venera 9* lands on Venus and sends back photos
First "hole" in the ozone layer observed over Antarctica
Berlin Wall opened
Hubble Space Telescope launched
Voyager I takes the first "family portrait" of our solar system from beyond Pluto
Mars Landing

Unit 1, Activity 19: Word Search

H E M I S P H E R E X Y O E N D N O R T H O G B O X K
W E S R A C D O V X R P L A M P Q Q R S V P Z R L R C
E V O G H E I T H L S P O S O U T H V O L S P L A C O
Q U A T O R V O L U S E R T I M E V O I M P Z C O V M
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A M B U L A X I B I X R O A R E S O P R O S E T X U A
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R O S E V I O L E R E S L A T I T U D E I N N A O K B
A G I S B U R L E E B A Y S O M M R I R O A D T H O S
V O L T E N O L E S T E M P L A T L O G N I R S V T O

Word List

atlas	hemisphere	rose
axis	latitude	south
compass	legend	time
east	north	west
equator	road	

Unit 2, Activity 36: Crossword Puzzle

Across

2. physical
5. projection
6. equator
9. axis
10. azimuthal
11. latitude
12. road
13. political
14. robinson
15. weather
17. atlas
18. time
19. topographic
20. large
21. hemispheres
22. compass
23. left
24. right

Down

1. cartographer
3. sinusoidal
4. Mercator
7. parallel
8. longitude
9. declination
13. thematic
16. Prime Meridian
17. rose

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Emphasis on cultural information.

Web Resources

Central Intelligence Agency (CIA) World Fact Book: www.adci.gov/cia/publications/nsolo/wfb-all.html

Information on environmental issues and treaties by country.

City Net: city.net/countries/united_states/

Links to cities all across the country.

Environmental Protection Agency: www.epa.gov/

EPA Center for Environmental Statistics: www.epa.gov/ces/

These two EPA sites cover a lot of information on environmental issues.

JASON Project: www.jasonproject.org/

Online scientific expeditions involving students and scientists.

Library of Congress: lcweb.loc.gov/

Interesting collection on the history of the conservation movement, among other items.

National Aeronautics and Space Aadministration (NASA) History: www.hq.nasa.gov/office/pao/History/history.html

History of space exploration.

National Geographic Society: www.nationalgeographic.com/main.html

Lots of information, maps, resources, fun and games.

National Geophysical Data Center: www.ngdc.noaa.gov/seg/segd.html

Information on magnetic declination.

National Wildlife Federation: www.nwf.gor/nwf/

Information on endangered species and other topics.

Rice University, History of Maps: www.cml.rice.edu/~ianius/pres/map/maphis.html

Good source for early history of geography and mapmaking.

United States Geological Survey (USGS), "Finding Your Way with a Map and Compass": www.usgs.gov/fact-sheets/finding-your-way/finding-your-way.html

USGS, "What Do Maps Show?" www.info.er.usgs.gov/education/teacher/what-do-maps-show/index.html

Both of these USGS sites are good for various cartography projects.

University of Tennessee, "Map Maker, Map Maker, Make Me a Map": www.loki.ur.utk.edu/ut2kids/maps/maps.html

Includes information on map projections.

Young Environmentalists' Action Newsletter: ww.globalresponse.org/yea/yeaindex.htm

Discusses current environmental issues and includes addresses for letter writing.

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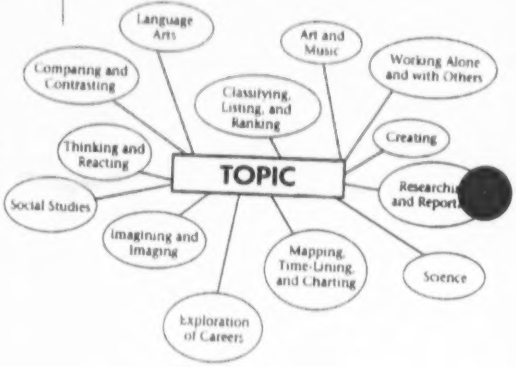
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